

①

$$y = x - 2 \quad \text{line}$$

$$y = x^2 - 2 \quad \text{parabola}$$

$$x - 2 = x^2 - 2$$

$$0 = x^2 - x$$

$$0 = x(x - 1)$$

$$x = 0 \quad x = 1$$

$$(0, -2) \quad (1, -1)$$

④

$$y = x \quad \text{line}$$

$$x^2 + y^2 = 4 \quad \text{circle}$$

$$x^2 + x^2 = 4$$

$$2x^2 = 4$$

$$x^2 = 2$$

$$x = \pm\sqrt{2}$$

$$y = \pm\sqrt{2}$$

$$(\sqrt{2}, \sqrt{2})$$

$$(-\sqrt{2}, -\sqrt{2})$$

③

$$y = 3x \quad \text{line}$$

$$x = y^2 \quad \text{parabola}$$

$$y = 3y^2$$

$$0 = 3y^2 - y$$

$$0 = y(3y - 1)$$

$$y = 0 \quad y = \frac{1}{3}$$

$$(0, 0) \quad \left(\frac{1}{9}, \frac{1}{3}\right)$$

$$\frac{1}{3} = 3x$$

$$\frac{1}{9} = x$$

⑥

$$y = 7 \quad \text{line}$$

$$x^2 + y^2 = 9 \quad \text{circle}$$

$$x^2 + 49 = 9$$

$$x^2 = -40$$

$$\text{no TR sol'n}$$

$$\textcircled{10} \quad y = x - 1 \quad \text{lin.}$$

$$y = x^2 \quad \text{par.}$$

$$x^2 = x - 1$$

$$x^2 - x + 1 = 0$$

$$\frac{1 \pm \sqrt{1 - 4(1)(1)}}{2}$$

2

no Real sol'n

$$\textcircled{13} \quad y = 4x \quad \text{lin.}$$

$$4x^2 + y^2 = 20 \quad \text{ellips.}$$

$$4x^2 + (4x)^2 = 20$$

$$16x^2$$

$$20x^2 = 20$$

$$x^2 = 1$$

$$x = \pm 1$$

$$(1, 4)$$

$$(-1, -4)$$

$$\textcircled{12} \quad y = x^2 + 1 \quad \text{par.}$$

$$y = -x^2 + 3 \quad \text{par.}$$

$$x^2 + 1 = -x^2 + 3$$

$$2x^2 = 2$$

$$x^2 = 1$$

$$x = \pm 1$$

$$(1, 2) (-1, 2)$$

$$\textcircled{15} \quad 4x^2 + 9y^2 = 36 \quad \text{ellips.}$$

$$x^2 - 9y^2 = 9 \quad \text{hyperbola}$$

$$5x^2 = 45$$

$$x^2 = 9$$

$$x = \pm 3$$

$$-9y^2 = 0$$

$$y^2 = 0$$

$$y = 0$$

$$(\pm 3, 0)$$

$$(16) \quad 3(y+2)^2 - 4(x-3)^2 = 12 \quad \text{hyp}$$

$$y = -2x + 2 \quad \text{lin}$$

$$3(-2x+2+2)^2 - 4(x-3)^2 = 12$$

$$3(4x^2 - 16x + 16) - 4(x^2 - 6x + 9) = 12$$

$$12x^2 - 48x + 48 - 4x^2 + 24x - 36 = 12$$

$$8x^2 - 24x = 0$$

$$8x(x-3) = 0$$

$$x = 0 \quad x = 3$$

$$y = 2 \quad y = -4$$

$$(0, 2) \quad (3, -4)$$

$$(18) \quad y^2 - 4x^2 = 4 \quad \text{hyp}$$

$$y = 2x \quad \text{lin}$$

$$(2x)^2 - 4x^2 = 4$$

$$0 = 4$$

$$\emptyset$$

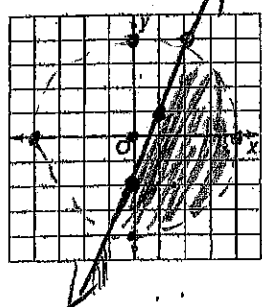
Solve each system of inequalities by graphing.

$$19. \quad y \leq 3x - 2$$

$$x^2 + y^2 < 16$$

$$C(0,0)$$

$$r=4$$



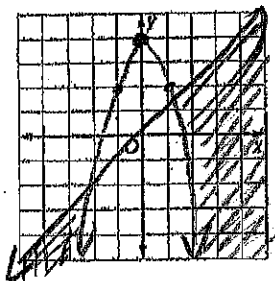
$$20. \quad y \leq x$$

$$y \geq -2x^2 + 4$$

$$V(0,4)$$

$$(1,2)$$

$$(-1,2)$$

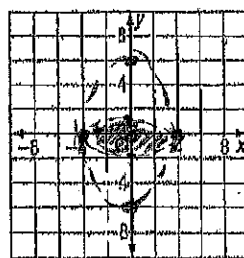


$$21. \quad 4y^2 + 9x^2 < 144$$

$$x^2 + 8y^2 < 16$$

$$\frac{y^2}{36} + \frac{x^2}{16} < 1$$

$$C(0,0)$$



$$\frac{x^2}{16} + \frac{y^2}{2} < 1$$

22. GARDENING An elliptical garden bed has a path from point A to point B. If the bed can be modeled by the equation $x^2 + 3y^2 = 12$ and the path can be modeled by the line $y = -\frac{1}{3}x$, what are the coordinates of points A and B?

$$x^2 + 3\left(-\frac{1}{3}x\right)^2 = 12$$

$$x^2 + \frac{1}{3}x^2 = 12$$

$$\frac{4}{3}x^2 = 12$$

$$x^2 = 9$$

$$x = \pm 3$$

$$y = -\frac{1}{3}x$$

$$(3, -1)$$

$$(-3, 1)$$

